Ferrero Canada

Ontario Hazelnut Symposium

27March2018

Agenda

Welcome

Introduction to Ferrero

Greetings from Jorge Acevedo, AgroInnovation

Post Harvest Operations

Ferrero Quality Standards

Orchard Establishment Considerations

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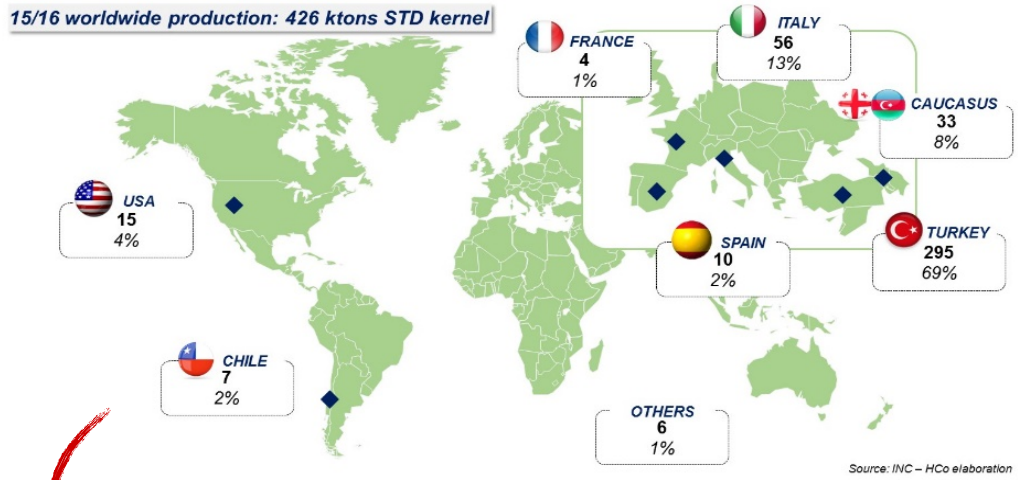
Agenda

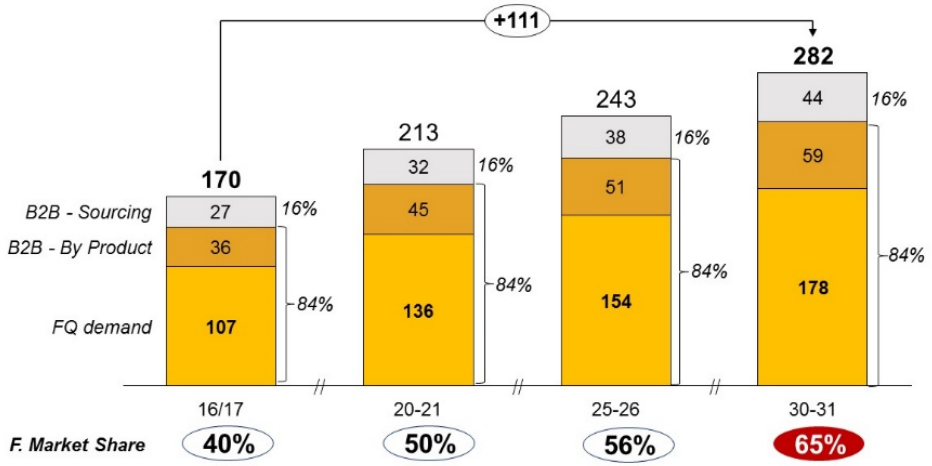
- Hazelnut Industry World Wide Scenario
- Ferrero's Global Strategy
- Current Situation in Ontario
- Ferrero's Vision for Ontario
- Conclusion

World Wide Scenario

- **Natural evolution:** in the next 15 years the hazelnut market will be stable (around 430k tons).



- **Ferrero needs:** Ferrero internal consumptions and B2B needs will grow from 170k tons to 282ktons



- **The market share dilemma**: the current market share (40%) and the natural evolution will put Ferrero in an unsustainable position (65% market share)

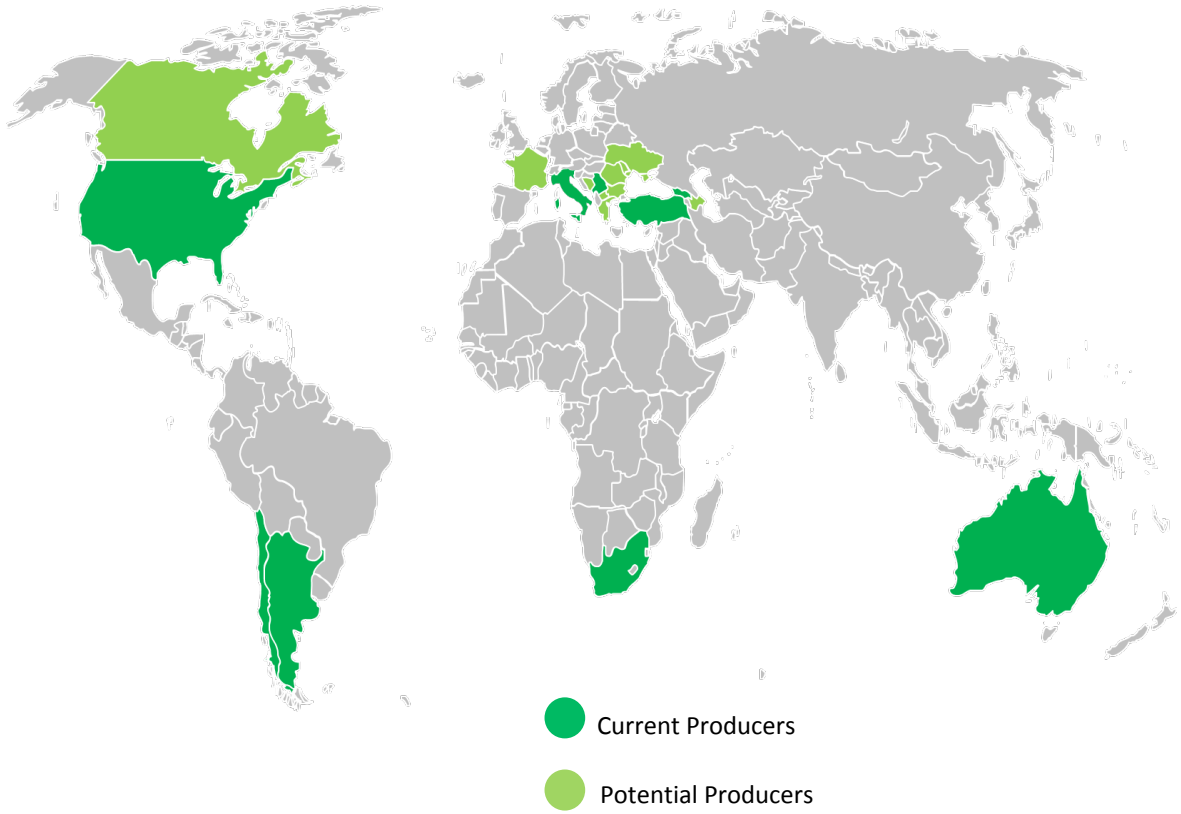
- Need of a new strategy**:** Due to this scenario a new strategy was defined aiming to keep Ferrero with a sustainable positioning/market share in the long run.

De-risking Supply Strategy

Ferrero's Global Strategy

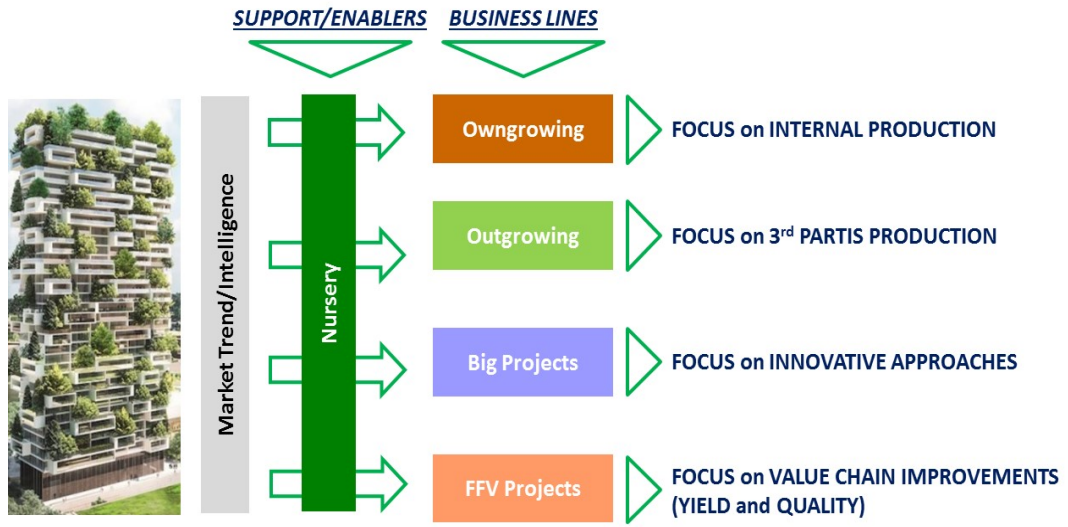
The strategy's first driver is the diversification of the supply sources. The diversification in intended in term of hemisphere and producing regions in order to:

- Minimize the supply risk
- Stabilize the supply in the years (all seasons long)



Ferrero organized its strategy deployment in five different business lines characterized by specific aims

Owngrowing	Farms owned and operated directly from Ferrero
Outgrowing	Development of the Hz Supply Chain purchasing the produced Hz with long term supply contracts
Big Projects	Supply Chain development projects with public and private partners aimed to develop from scratch the Hz Industry
FFV Projects	Development project aiming to increase the efficiency and the effectiveness of the entire SC
Nursery	Provide trees of the right varieties and in right quantities



Current Situation in Ontario – Part of the De-risking Strategy

Locally supported research confirmed an interesting opportunity for Ferrero to deploy a **De-risking development strategy**

- Some hazelnut varieties were identified as suitable for industrial production
- Some parts of Ontario were identified suitable as well for the hazelnut farming

Current Situation in Ontario – Consolidated Relations with Canada

1. The Brantford Plant

- 89.000 m^2 production facility
- First Ferrero facility in North America
- Brantford plant was built in 2004 and began production in 2006
- In 2018 Brantford will be the first plant out of Europe to process cocoa beans

Brantford has **800 permanent employees and 500 temps**

Current Situation in Ontario – Consolidated Relations with Canada

2. The Memorandum of Understanding between Ferrero and the Ontario Hazelnut Association

- First signed in Sept. 2013 and renewed in 2016
- two hazelnut varieties were identified as suitable for industrial production

Current Situation in Ontario – Research and Government Relationships

3. Main Research and Development activities

- Already consolidated key research partnership with:
  - **University of Guelph**, in particular in the person of
    - Dr. Praveen Saxena (GRIPP, tissue culture);
    - Dr. Toktam Tagavi (physiology);

- **Niagara College** – Dr. Mike Dixon – Precision Agriculture
- **Agriculture Canada** - Dr. Tara Gariepy; Dr. Rob Nurse; Dr. Julia Mlynarek; Dr. Genevieve Marchand; Dr. Jean-Philippe Parent; Dr. Antonet Svircev …
- **OMAFRA** – Melanie Filotas, Todd Leuty, Helen Scutt

Current Situation in Ontario – Other Investments

Ferrero has already contributed to the R&D activity with a direct investment of more than CAD 600,000 in Ontario based hazelnut projects

- **Simcoe Research Station** (UoG): Two adult orchard with 23 varieties are being monitored to evaluate:
  - Winter hardiness: Damage to branches
  - Yield and nut quality
  - Phenology stages of reproductive and vegetative buds
  - Growing Degree Days
  - Identification of self-incompatibility alleles of the varieties: ‘C16’, ‘C409, ‘C28, ‘Gene’ and ‘Slate’

Ferrero's Vision for Ontario

- Ferrero, counting of the consolidated experience matured in other geographies, has already defined a specific approach to successfully develop the hazelnut industry within Ontario. The vision is articulated in four main elements:

1. **Pre-outgrowing project (1,000 ha in two years)**
2. **Out-growing campaign (9,000 ha in eight years)**
3. **Creation of the Supply Chain**
4. **Ferrero's direct contribution**

Long term commitment:

- Brantford plant activity
- Long-term supply contracts
- R&D continuing investments

Knowledge transfer to growers and other third parties

Ferrero's Vision for Ontario – Pre-outgrowing Project

- 1,000 Ha in the next 2 years
- high-value crop
- Ferrero is blazing the trail to market
- **Parameters**:
  - Ferrero quality varieties
  - Eastern Filbert Blight tolerance
  - Cold tolerance/Phenology

Ferrero’s Vision for Ontario – Pre-outgrowing Project

- 9,000 ha in 8 years
- SW Ontario and other areas in Canada represent major opportunities
- Local supply of quality hazelnuts for the Brantford facility and the World – a profitable sustainable crop for Ontario farmers.
- Outgrowing campaign will be the first step in the development of the entire Supply Chain in the region, from R&D, producers, processors and final consumers

Ferrero’s Vision for Ontario – Creation of the Supply Chain

Creation of the Supply Chain

Farmers

Through the direct involvement of associations Ferrero will provide to the farmers the know how to establish successfully the hazelnut cultivation, providing knowledge transfer on best agriculture practices included plants varieties, farming methodologies and supporting the plants supply

Dryers

Ferrero will provide the know how and the support to the development of private dryers which will the main aggregators for the industry. They will be a strategic element due to the direct impact of drying on the final quality of the product

Processors

Ferrero will sponsor the development of final processors in charge of cracking and transformation process

Conclusions

Ferrero considers Ontario an interesting location to pursue its **de-risking Global supply strategy:**

- **Consolidated relationships** concerning production (Brantford plant), **R&D** and **Business Development**
- Strong **interest of farmers** and **local communities** looking for new business opportunities and diversification

Pre-outgrowing project – the development of the first 1,000 ha in two years (2018 – 2020)

- **Outgrowing campaign**, the development of other 9,000 ha in the next 8 years (2021 – 2029)
- Supporting the **creation** of the **hazelnut supply chain** through long term supply commitment and continued R&D activity, knowledge transfer, long-term supply commitment and continued R&D activity

Hazelnut post harvesting operations

Post harvesting phase

Hazelnut post harvest phase

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DRYING

- ✓ Cleaning
- ✓ Drying
- ✓ Calibrating in-shell

CRACKING

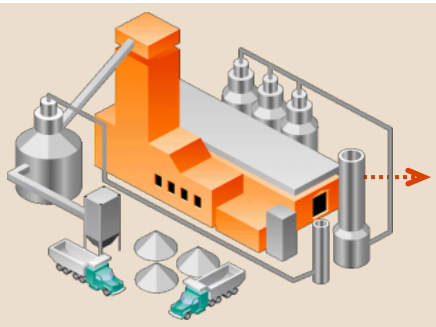
- ✓ Sorting
- ✓ Cracking
- ✓ Calibrating shelled

PROCESSING

- ✓ Quality check
- ✓ Receiving / storing
- ✓ Roasting
- ✓ Processing
- ✓ Final product








Cleaning hazelnuts before drying

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- ✓ Useful for taking out all the impurities such as stones, leaf, husk, blank nuts etc.
- ✓ Avoid possibility to burn the hazelnuts during drying process

Natural drying

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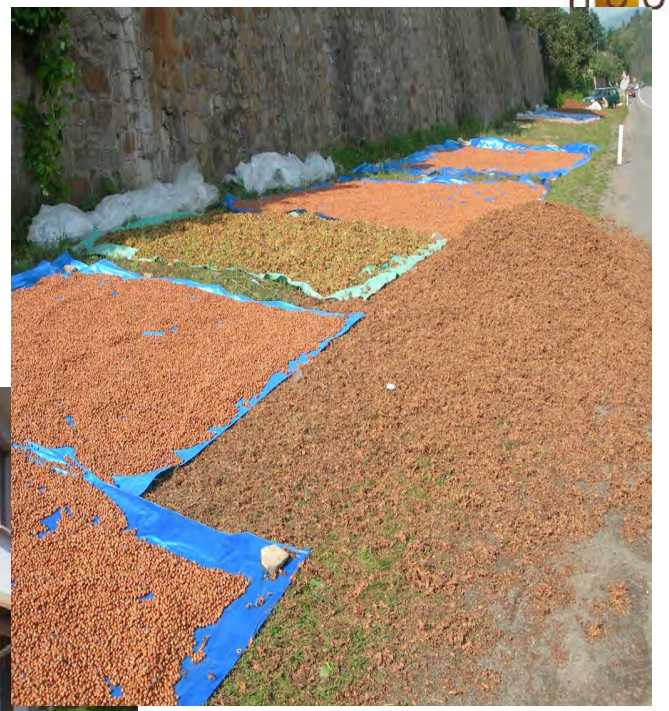
SINGLE LAYER



Mechanical drying

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- ✓ Best drying is **with low temperature (35-40 Cº) for long time**
- ✓ Drying efficiency is directly related to moisture content
- ✓ **Maximum moisture content permitted after drying is 6%**

Drying hazelnuts

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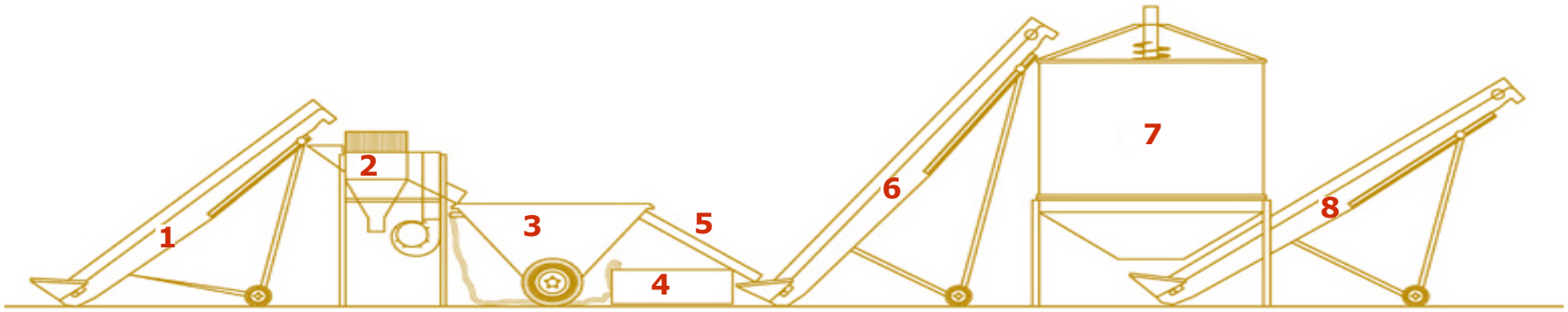

THE POST-HARVEST PHASE OF HAZELNUTS PROCESSING IS NECESSARY FOR THEIR PROPER CONSERVATION

LEGEND: 1-5-7: Conveyor belt **2:** Separating fan **3-4:** Swilling tank with accessories **6:** Dryer

Sizing

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Genetic

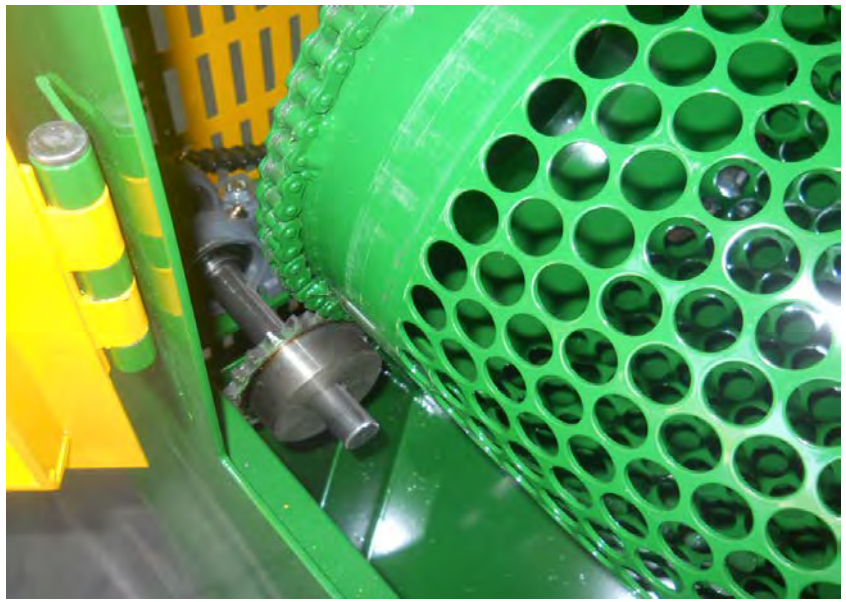
- ✓ Kernel variety range between 10 and 15 mm
- ✓ Jumbo nuts over 20 mm

Cultivation

- ✓ Irrigation
- ✓ Pruning
- ✓ Fertilization

Calibration in-shell before cracking

- ✓ Calibration after cracking



Cracking

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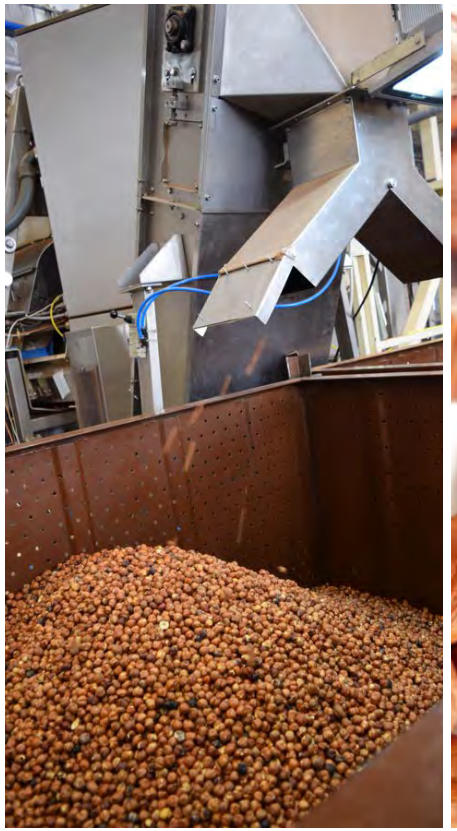
- ✓ Mechanical damage during cracking **causes oil oxidation**.
  - ✓ shell filling
  - ✓ cracking machine setup
- ✓ Sieves and air system must be used in order to remove stones and shell fragments



IN-SHELL HAZELNUTS

- ✓ Room temperature no R.H. control

SHELLED HAZELNUTS

- ✓ 5°C – 60% R.H.
- ✓ -25°C
- ✓ 5°C – 60% R.H. under N_2 pressure
- ✓ 5°C vacuum packing

Sorting

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- ✓ **Manual**
- ✓ **Mechanical**

Both of them are effective just on visible defects. Invisible rotten and insect damaged hazelnuts can’t be detected

Peeling

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Quality control

Defects and characteristics

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Full sample test

In-shell merceological evaluation	Weight, shape, caliber
Kernel merceological evaluation	Weight, shape, caliber, defects, blanching.
[illegible]	Pesticides, Cd, Pb, Aflatoxins, % of oleic acid
Organoleptic evaluation	Chopped raw and roasted

Quality control in receiving

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SHAPE

ROUND | POINTED | ALMOND SHAPED

SHAPE

SINGLE

TWINS

COLOR

YELLOWISH

BLACK

Quality control in receiving

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DAMAGE

Visible insect / pest damage

Visible damage on kernel surface

MOLD

Visible mold outside the kernels

Visible mold inside the kernels

SHRIVELLED/ SHRUNKEN

Wrinkling of kernel

Deformed shape

DECAY

Outer surface rot

Quality control in receiving - Defects

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ROTTEN

In this case there are hazelnuts with worms, rotten or mouldy. The defect can interest the whole fruit or an its portion only. Rotten fruits have an altered (bad) taste

BROKEN

Broken hazelnuts are the fruits broken during the operations of eliminating shells. This defect increases oxidation of hazelnuts

ROTTEN

BROKEN

Quality control in receiving - Defects

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INSECT DAMAGED (CIMICIATO)

This terms refers to fruits with insects damage. If an insect attacks a hazelnuts near formed, the shell will be empty. If the attack occurs during the developing of a hazelnuts, the fruit will have dark kernels, white spots and a disgusting taste. The defect can interests the whole fruit or a portion only. A hazelnuts is considered insect damaged if there are white spot with a diameter larger than 2 mm or with dark spots larger than 1 mm

HAZEL BUGS

WEVEEL

Quality control in receiving - Defects

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TWIN

There are twin fruits when in one shell are present 2 hazelnuts (this definition considers also separated twin nuts). Shrivelled hazelnuts with folds and wrinkles on their surface (on the whole surface or on a portion only)

YELLOWED

Turned yellow fruits are hazelnuts with a coloration more intense than the normal yellow of hazelnuts. It’s typical of old fruits or bad stored fruits

Quality control in receiving - Defects

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MECHANICALLY DAMAGED FRUITS

During the operation of shell removing, the machine can also remove peel and damage kernels

SHRIVELLED

Starting at the phase of developments of hazelnut kernel. The origin could be caused by stress occurred to the plant (climate, fertilization etc.)

Field induced defects

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MOLDS

Genetics: Some varieties seem to be more susceptible in particular conditions (high humidity)
Cultivation: First harvest anticipated. 2-3 harvests not to leave nuts on the soil

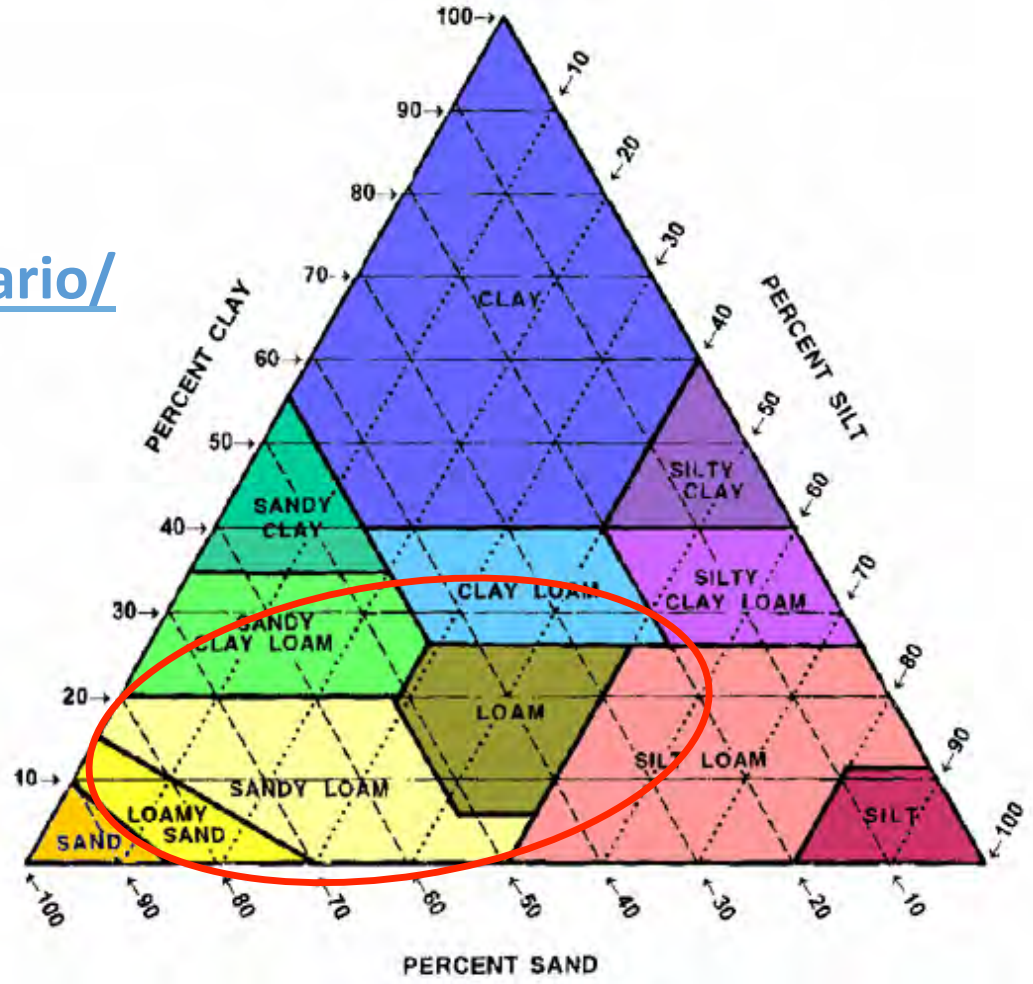
BLANKS

Caused during the developments of hazelnut kernel. Could be the effect of not balanced fertilization, genetics

Orchard Establishment Considerations

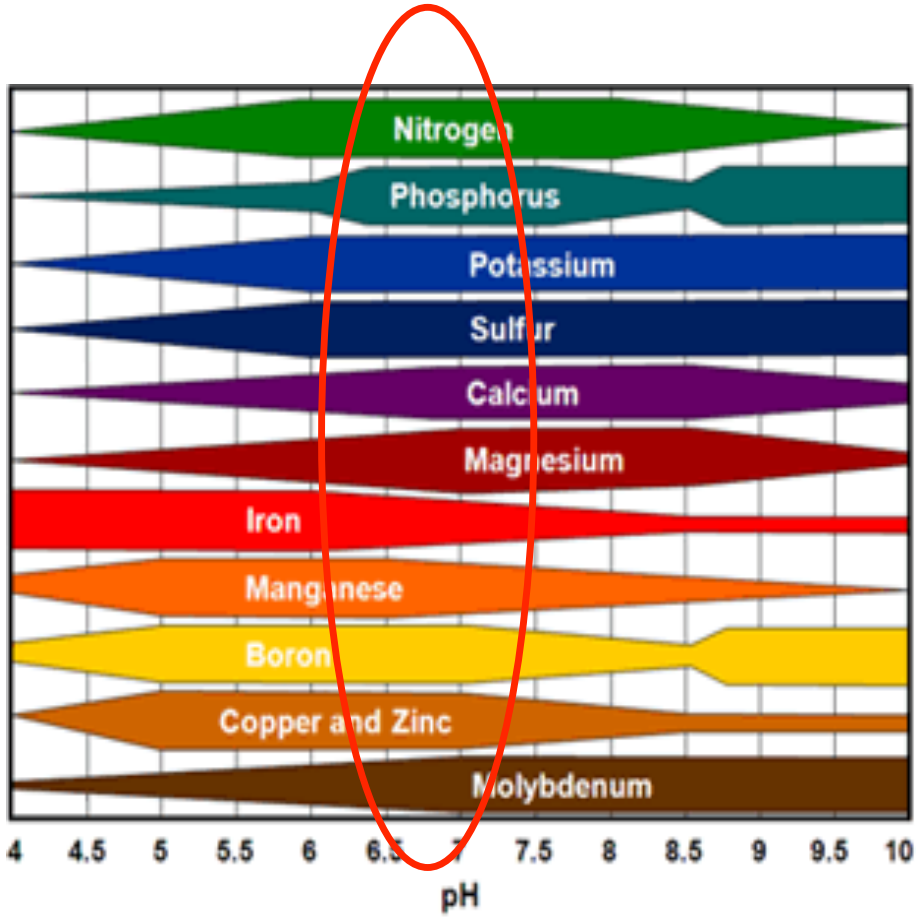
Soil Texture

https://agroinnovation.shinyapps.io/Ontario/

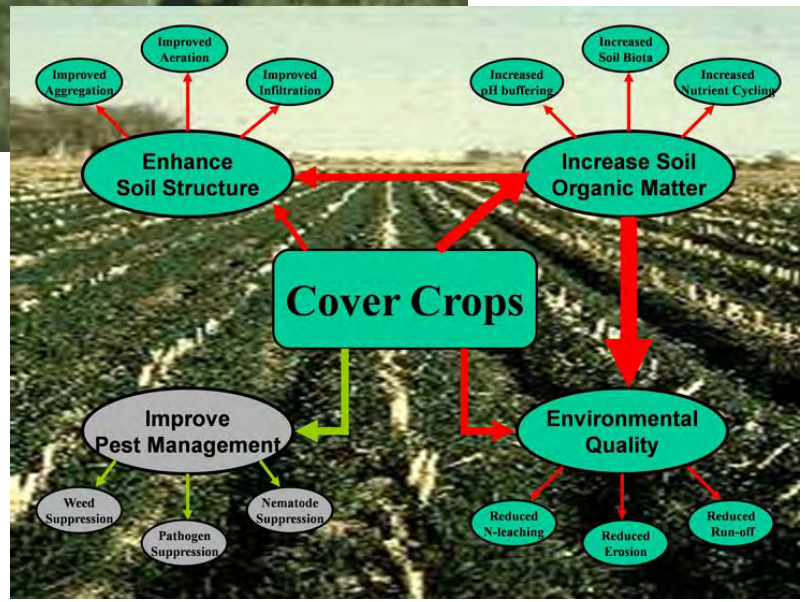


Soil Testing

Influence of pH on nutrient availability



Land Preparation



Water – drainage and irrigation

Nursery Stock

Clonally propagated for commercial production

Reputable nursery

Order early:
main cultivars (80-90%)
compatible pollenizers (10-20%)

Orchard Layout

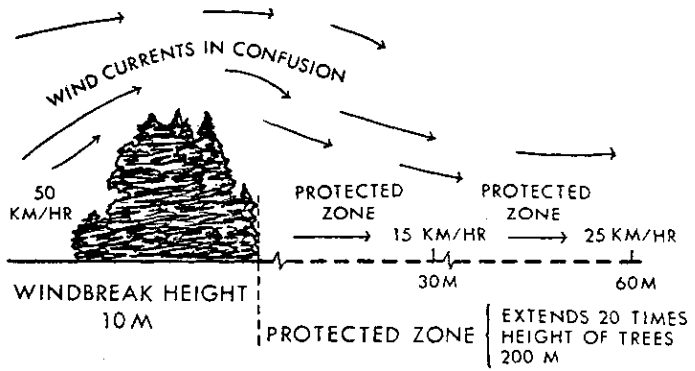
Pollenizers in rows

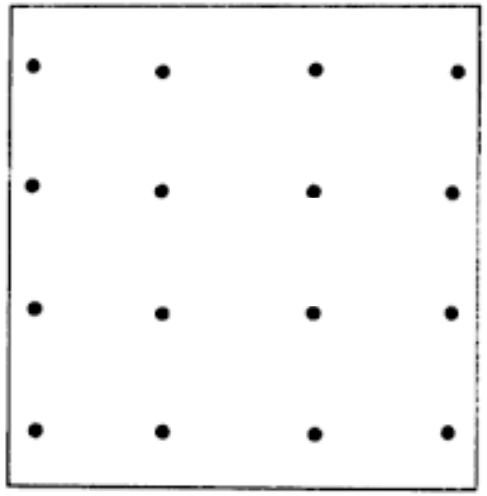
Planting density

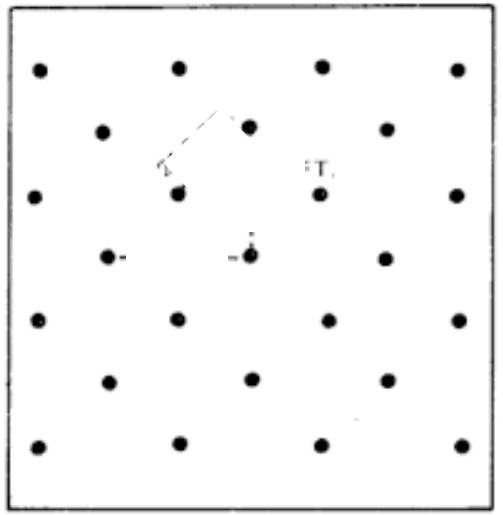
Row spacings

Tree shape

Wind Breaks




a-Square


b-Quincunx or Diagonal

Orchard Establishment Considerations

Weed Control

Sucker Control

Tree Guards

Orchard Establishment Considerations

Eastern Filbert Blight

Thank you…

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Agronomist

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